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McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER	
SAGAR, KRIPA	

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1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/804,158	KAWADA ET AL.	
	Examiner	Art Unit	
	Kripa Sagar	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,15-62 and 66-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27-37 and 45-59* is/are allowed.

6)☒ Claim(s) *1-7,15-26,38-44,60-62 and 66-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 March 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed 6/14/04 has been entered. Claims 1,15,38 have been amended. No new matter has been added.

Claims 1-7,15-62, 66-71 are under consideration.

Drawings

2. The drawings are objected to because of a typographic error. Fig.1 contains a label "inertia gas" on the right hand side. This should be "inert gas". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: Typographic errors.

The column labels on Table 10 (p.17) indicate the measured quantities for transmittance and phase difference as "n" and "k". They should be labeled as "%" and "deg." respectively.

The specification on p.21; line 29 refers to a Table (" as shown in Table") but omits the Table number.

On p.32;line 18 the specification states "In addition since the L/S distance is large.."; it is understood that in LTS, the target-source distance, T/S, is large. Clarification is sought on "L/S" distance.

Appropriate correction is required.

Claim Objections

4. Claims 1,15,38, 27-37, 45-59 are objected to because of the following informalities:

Claims 1,15,38 respectively recite a film, a blank and a mask "configured for exposure with ArF laser wavelength". Exposure is carried out with a laser or a radiation with a specific wavelength. Examiner recommends that the term "wavelength" be deleted or the term "radiation" be added after "wavelength".

Claims 27-37,45-49 recite in line 1, " A process for blanks" / "A process for a phase shift mask".

The process is for "making" a blank or phase shift mask.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1,15,38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The amended claims recite, for example, in claim 1, line 3 " wherein the phase shifter film is configured for exposure with ArF laser wavelength". The specification defines the "configuration" on page 23, lines 3-10 with reference to fig.4:
"This phase shift pattern 30 is configured of the first light transmission part 10, wherein the transparent substrate 1 is exposed; and of the second light transmission part 4, wherein the phase and the transmittance of the transmitted exposure light is converted by approximately 180'deg' with respect to the phase of exposure light, which transmits through the first light transmission part 10, and which has a necessary transmittance (for example 1% to 40%) and is made of a single material."
Since the only amendment is specific to the configuration for exposure with ArF, the disclosure does not clarify how this configuration would differ from that for any other

exposure light. There is no configuration disclosed for exposure with ArF in the specification. There is no unambiguous definition of the product.

Further Applicants disclose a broad range for transmission (1% - 40% above) whereas the exemplary data suggests transmissions in the range 1-8%. Applicants also assert (p.20;line 20 – p.21;line4) that a transmission value of 8% for ArF wavelength is "high quality". Applicants' definition of the product is thus vague and tenuous.

Applicants' exemplary data is restricted to Mo-Si-ON films but they assert films of other materials (p.26;l.4-8) may be formed by this method. It is not clear that the films, blanks and masks formed of MoSiON by the LTS method can be extended to other films. In an earlier submitted paper (dated 6/16/03; p.15) Applicants had argued:
"In this regard, Applicants disagree with the Examiner's characterization of the teachings of Nagatani. Nagatani does not teach using a long-throw sputtering device to form a metal nitride film. Instead, Nagatani only teaches the use of a long-throw sputtering device to form a titanium nitride film. By asserting that the teachings of Nagatani relate to metal nitride films, instead of titanium nitride films, the Examiner has improperly broadened the teachings of Nagatani, as one having ordinary skill in the art, when reviewing the teachings of Nagatani, would not believe that the use of a long-throw sputter device has been enabled for all metal nitride films."
Such inconsistencies in the specification and arguments and vague definition of the invention raise doubts that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> or
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1-7,15-26,38-44 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Pat. 5635315 to Mitsui ('315 reference).

The instant claims recite a phase shift film, a phase shift mask (PSM) blank and a phase shift mask wherein the film is deposited by a long throw sputtering device.

Mitsui (col.1;line.5 – col.7;line.44) teaches a phase shift mask (PSM) film, mask blanks and a PSM wherein the phase shift film comprises Mo,Si,O and N (2;47-4;8 & fig.5). The use of the film for ArF radiation is implicitly disclosed. It specifically teaches

a method to adjust the composition and thickness for other radiations (7;17-26). Exemplary radiations include 436nm and 248 nm radiations. Adjusting the refractive index and absorption index, as taught herein, for the ArF radiation (193nm) would be within the skill level of a practitioner of the art; Mitsui asserts that such adjustments are relatively easy (7;4-9). Thus Mitsui teaches the elements of claims 1,15,38. which recite a film, a mask blank and a mask. Applicant has not claimed unique structures for the film. A blank or a mask comprising the film has not been shown to be structurally different from those of the '315 reference. Claims 2-7,16-26,39-44 recite the methods of forming the film and do not further characterize the products claimed.

The method of forming the products is accorded little weight in these product-by-process claims where no structure or unique function is recited. Mitsui does not teach that the films are formed by a long throw sputtering device or method; however a MoSiON film, mask blank or mask formed by Mitsui's conventional method would appear to be the same as the phase shift films, mask blanks and masks of the instant claims.

9. Claims 60,61,62 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Pat.5942356 to Mitsui et al. ('356 reference)

Claim 60 recites an exposure method using a PSM with a MoSiON film formed by long throw sputtering. Semiconductor devices are manufactured using the PSM [cl.61,62].

Mitsui (col.1;line.5 – col.13;line.10) teaches an exposure technique using a PSM with a MoSiON film (17;6—18;36). The patent claims successful exposure using the mask and the exposure technique. The film is not formed by long throw sputtering – however the exposure technique would appear to be the same as the instant method using a phase shift mask with an LTS film.

It teaches forming semiconductor devices using the PSM with MoSiON film (18;37-20;34). The devices are not formed, using the PSM with a film deposited by long throw sputtering – however the devices would appear to be the same as the instant claimed devices.

10. Claims 1,15,38 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Pat.5728494 to Kawano et al.

Kawano teaches a phase shift film 12, a mask blank and a phase shift mask (Fig.10,12) that can transmit ArF radiation (15;3-9). Comparing Kawano's figures with those of instant fig.4 and the definition in the instant specification (p.23;l.3-10) it would appear that the structure of the film , the mask blank and the mask are similar.
Thus Kawano teaches the elements of claims 1,15,38. which recite a film, a mask blank and a mask. Applicant has not claimed unique structures for the film. A blank or a mask comprising the film does not appear to be structurally different from those of the instant invention.

The method of forming the products is accorded little weight in these product-by-process claims where no structure or unique function is recited. Kawano does not teach that the films are formed by a long throw sputtering device or method; however a phase

shift film, mask blank or mask formed by Kawano's conventional method would appear to be the same as the phase shift films, mask blanks and masks of the instant claims and perform equally well.

11. Claims 1,15,18 rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over 6309780 to Smith.

The structure of the film, the mask blank (fig.1), the phase shift mask and their optical properties (transmission, extinction coefficient k and refractive index n) of the film under 193nm radiation (fig.2.See also 2;15-34 and 7;26-46 for the properties of the mask) appear to meet the limitations of the instant claims and as defined in the instant specification (instant fig.4 and p.23;l.3-10).

Thus Smith teaches the elements of claims 1,15,38. which recite a film, a mask blank and a mask. Applicant has not claimed unique structures for the film. A blank or a mask comprising the film, disclosed by Smith, does not appear to be structurally different from that of the instant invention.

The method of forming the products is accorded little weight in these product-by-process claims where no structure or unique function is recited. Smith does not teach that the films are formed by a long throw sputtering device or method; however a phase shift film, mask blank or mask formed by Smith's conventional method would appear to be the same as the phase shift films, mask blanks and masks of the instant claims and to perform equally well.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 66-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over the '315 reference in view of the '356 reference and further in view of US Pat.5605776 to Isao et al. cited by Applicants.

The instant claims recite film thickness and optical characteristics. Two-layered films are also recited.

The '315 reference teaches a phase shift film of the instant invention.

The '356 reference teaches a method of depositing MoSiON phase shifting films by reactive ion sputtering. The '356 reference teaches that the optical characteristics of the film can be adjusted (2;43-3;3) and teaches compositions and optical characteristics (T% and n) of films (figs.7,8). This is reinforced by the teachings of the '315 reference shown in Table 1 (col.5).

The '356 reference does not teach multi-layered films.

Applicants-cited prior art teaches that two-layered MoSiON phase shift films are conventional and known in the art. The thickness and the optical characteristics are adjusted to the radiation used (Isao:1;8-2;36). Isao's improvements comprise adjusting

the composition of the film and using multiple layers with an average composition (3;15-4;29).

One of ordinary skill in the art at the time the invention was made would adjust the film forming conditions taught by the '315 and '356 references to arrive at the designed characteristics because both references teach the same method of solving the same problem – viz. the adjustment of the film characteristics to the radiation used ('356: 2;28-43 & '315: 7;16-26). The motivation for forming plural layers as taught by Isao arises from the reference teaching that the plural layers minimize lateral etching, thereby providing mask features with vertical sidewalls. This results in more accurate pattern transfer (3;8-14).

Allowable Subject Matter

14. Claims 27-37, 45-59 are allowed.

15. The following is an examiner's statement of reasons for allowance:

Independent claims 27 and 45 recite the process steps for making, mask blanks and PSMs using long throw sputtering.

The phase shift films of the instant claims are known in prior art as taught in the '315 and '365 references. Long throw sputtering is a known variant of conventional sputtering techniques used in the '315 and '365 references. This is also admitted prior art (spec:p.2;23-30). However the application of long throw sputtering *techniques* to the films taught by the '315 and '365 references would require considerable experimentation. Applicants' data and comparative examples are evidence of this.

Claims 28-37 and 46-59 are allowable at least for their dependence from claims 27 and 46.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

16. Examiner thanks the Applicants for highlighting the numerous typographic and grammatical errors in the prior office action. Every effort has been made to avoid such errors.

17. Applicants' arguments presented 6/14/04 have been considered.

Independent claims 1,15, 38 recite a generic phase shifting film, a generic PSM blank and a generic PSM each "configured for exposure with" ArF radiation"; the dependent claims limit the *method of making* the film on these products -- viz. long throw sputtering. Claims 66-71 recite the optical characteristics of the film.

Claim 60 recites an exposure method using a PSM with a phase shift film formed by long throw sputtering. Semiconductor devices are manufactured using the PSM [cl.61,62].

It bears repetition that the unobvious element of the invention is a *method* of forming a phase shifting film and should be so claimed.

Applicants do not and in fact cannot claim a phase shift film *per se* since these are known as shown above; further it is admitted as prior art by Applicant and in Applicant cited reference to Isao. Examiner takes official notice and has shown above that a multitude of phase shift films, transmissive to ArF radiation, are known in the art. They have diverse structures (layered or otherwise) and are formed by diverse methods; they have n and k values and transmittances in the range specified by the Applicants.

Applicants do not and in fact cannot claim to have invented long-throw sputtering *per se*. This has been known in the art as shown in the previous rejections and may be readily verified. It is also admitted as prior art by Applicant (specification: p.2;l. 23-30).

Applicants are invited to structurally distinguish the phase shift film, the mask blank or the phase shift mask from prior art film, blank or mask cited above.

The amendment recites (for example in claim 1) configuring the film "for exposure with ArF laser wavelength" (radiation?). The specification does not disclose the configuration for exposure with ArF. Applicants argue (instant remarks p.17; line 4 from bottom) that they were unable to find "conditions acceptable for use with an ArF (193nm) using phase shifter films of the prior art". Applicants do not disclose what those conditions are. They proceed to assert that "by reactive long throw sputtering, Applicants were able to produce a phase shifter film that is configured to be exposed with ArF laser wavelength". Applicants' own data, as shown in the previous office action, does not distinguish between the LTS and conventional methods with respect to the conditions or the configuration of the film for exposure with ArF radiation. The newly

cited references also suggest that generic masks made by conventional methods routinely and successfully perform as well as the instant claimed films, blanks or masks in terms of T%,n,k or phase shifting.

Applicants allege that the office action contains misstatements and misapplication of the law (p.18). The alleged misapplication of the law it is asserted includes:

(A) not considering the product-by process limitation; (B) not providing a rational or reasoned argument identifying the similarities of the prior art and instant products (C) shifting the burden of proof

These arguments are not persuasive for the following reasons.

(A) The Examiner has *noted and considered* the product-by-process limitations; this should be evident from every office action in this prosecution. Examiner has stated that these limitations have been accorded little weight since the process imparts no distinguishing structure or unique function. Note that the generic phase shift films, blanks and masks are disclosed by Mitsui as argued in earlier office actions and re-stated above. They appear to have the same physical structure, optical characteristics and perform well as phase shifting films and masks. This would have been evident to one of ordinary skill in the art. Stated plainly Examiner is provided with no structural characteristics of the LTS film which would distinguish it from conventionally formed films (or blanks or masks) of prior art. Further Examiner cannot infer any functional difference between the LTS-formed film and the prior-art films since no distinct functional characteristics have been provided. Stated plainly there appears to be no

functional difference between the claimed films (blanks or masks) and those of prior art. Therefore the method of making can be accorded little weight.

(B) No rationale: One of ordinary skill in the art would have recognized that the Examiner cited references teach the same film, blank and mask as the instant claimed film, blank or mask. However it bears repeating here that the specification does not disclose a structure obtained by LTS nor do the claims recite the structure.

(B1) These arguments also raise grave doubts about the Applicants' comprehension of their invention. A skilled artisan would have recognized the difference between macro-structures of films/masks and the microstructures of films formed by a process. Evidence of microstructural differences are provided by X-ray diffraction (XRD) or electron microscopy (SEM, TEM etc). US Pat. 5939925 to Dove et al. indicate that their films were characterized by XRD and profilometry (3;18-37). US Pat.5897976 to Carcia et al. shows in fig.1,2 the structural characteristics of phase shift films formed by a conventional process using XRD. Mitsui ('315) characterizes the composition of his film with a depth profile (fig.5). By contrast Applicants provide no evidence that their film formed by LTS is structurally (or functionally) different from those of prior art.

(C) Applicants' have argued on p.18-19 that the absence of a rationale prematurely shifts the burden of proof to the Applicants. The above arguments prove that the rationale was explicitly stated in the prior office actions. Further, case laws were provided to clarify Examiner's position. ." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) establishes that if the prior art product is the same as that of

the claimed product then the manner of making it is irrelevant. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983) requires the Applicants to show obvious differences from prior art product. Examiner asserts that if a prior art structure is capable of performing the intended use as recited in the claim, then it meets the claim. See, e.g., In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). The cited films and masks appear to be the same ,attenuate ArF radiation and phase shift the radiation to successfully form patterns and to fabricate devices; thus Examiner has met his burden of proof.

(C1) Further Applicants are inconsistent in their arguments with regard to performance. On p.19, para #1, they argue "... whether or not a MoSiON film formed by (any) other method would function as well as the claimed film, blank or mask is immaterial to a novelty or obviousness rejection. The device claims are to structure not function." Yet the *only evidence* of structural difference offered by Applicants are the performance (functional) measures (of transmittance, phase shift, refractive index and extinction coefficient). As argued above where no unique (or even identifiable) structures are presented then a device which performs the same as the claimed device meets the claim

(D) Applicants not only fail to highlight the unobvious features of their film but contend that Examiner's statements are unsubstantiated (p.19; para #2). Applicants argue that the *large volume of data* provided substantiate their claims that an LTS formed phase shift film is different from the conventionally formed phase shift film – structurally.

(D1) Applicants' arguments regarding density of films and lower impurities in LTS-formed films (advanced in the earlier filed response) are not supported by any data nor is it known to one of ordinary skill in the art. Examiner challenges the Applicants to prove that an LTS-formed film (for example) has a higher density than a conventional film. (D2) Examiner has shown that the properties of the art-cited films are the same as or similar to those of the instant claimed properties. Generic phase-shift films and MoSiON films in particular have been routinely used in the art for a long time as evidenced by the references above. Thus the statement that -- there is *no data* to support the assertion that a MoSiON film would perform as well as the instant films regardless of the method of making it -- ignores facts. (D3) Mere *volume of data* cannot substantiate a claim. Applicants' own data and also cited reference data do not show any differences between the films formed by different methods---with respect to transmission, refractive index n, extinction coefficient k and phase shifting (conventionally 180 deg.). Examiner demonstrated the ***overlap in the data ranges*** to prove this. Applicants are invited once again to show the distinct differences in any structural or functional properties of the LTS-formed film.

(E) Examiner agrees with Applicants' argument that the process of making, makes the microstructures different.

(E1)This is well established in the metallurgical arts through microscopy, metallography, XRD and numerous other techniques and is readily amenable to verification. However it is not clear to the Examiner that there is any evidence showing that an LTS-formed film differs microstructurally from a film formed by a conventional

low pressure deposition process. Examiner understands that the LTS process provides more uniform coverage of the substrate. However techniques, with atmosphere control (gas) *without* the long-throw set up are known to produce microstructurally similar films (see Smy et al. IEEE;1988 and Konopka et al. Soc.Vac.Coaters;1999; attached). Examiner asserts that Applicants' assumptions are false when they state (p.20;last para) " ... by reciting that the claimed film is formed by reactive long throw sputtering Applicants have structurally defined the claimed invention". There is *no inherent structure* (micro or macro) associated with an LTS film that would differentiate it from a conventionally sputtered film. Applicants are invited to provide evidence of the microstructural differences in support of their argument.

(E2) It is not clear that (micro) structural differences alone confer patentability to product-by-process claims. Paper-weights made by the different processes, argued by Applicants on p.20, would not confer patentability unless the (micro) structural differences are critical to the function of the paper-weights (in view of *in re Schreiber* above) The structure of a red-painted widget would differ from that of a blue-painted widget, but would not be patentable unless aesthetic values are claimed.

(F) Applicants' arguments with respect to claim 60 has been addressed in the earlier office action and re-stated above. Applicants' have not shown any manipulative difference from conventional exposure techniques using a conventionally formed mask with a conventionally formed film compared to the instant claimed exposure process. . In order to be given weight to the structure used in a methods claim the recited structure limitation must affect the method in a manipulative sense (*ex parte* Pfeiffer, 1962 C.D.

408 (1961)). The "315 reference and the '356 reference both teach conventional exposure methods well known in the art. A person of ordinary skill in the art would recognize the inherent steps of conventional lithography recited in these references. Stated plainly, Applicant has not shown how an exposure method using a phase shift mask comprising a film formed by the instant method would *manipulatively* differ from the method taught by the references.

Applicants' arguments with regard to claims 61-62 are the same as those with respect to claims 1,15,38,60 and their dependent claims. It would appear from the arguments (p.21) that generic semiconductor devices with unspecified structures would be different microstructurally or perform differently from similar devices fabricated by conventional methods using masks not made with LTS films. Applicants are invited to submit evidence of the device structure and comparative data with other devices.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicants are strongly urged to consider these references and the state of the art at the time the invention was made in their response:

US Pats. 6087047 (col.8;l.1-6), 5897977 (fig.1-12), teach a phase shift film configured for ArF exposure.

US Pat.5939227 teaches a phase shift film with TiN and may be combined with the Nagatani reference (LTS of TiN films) to read on the process claims.

19. The rejections and the response to arguments are designed to identify and frame the issues in anticipation of an appeal. However should the Applicants feel that the issues can be resolved in a personal meeting, they are encouraged to contact the Examiner to arrange for an interview.

20. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 571-272-1392. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MH/ks

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700